ABSTRACT OF THE DISCLOSURE

The semiconductor device comprises a collector layer 14; a base layer 16 of a carbon-doped $Ga_xIn_{1-x}As_ySb_{1-y}$ layer having one surface connected to the collector layer 14; an emitter layer 18 connected the other surface of the base layer 16; a base contact layer 30 of a carbon-doped GaAsSb layer electrically connected to the base layer 16; and a base electrode 32 formed on the base contact layer 30. The semiconductor device of such structure can have a much reduced base resistance R_s, whereby InP/GaInAsSb-based HBTs including InP/InGaAs-based HBTs can have higher maximum oscillation frequency f_{max}. Because of the carbon-doped semiconductor layer the semiconductor device can have higher reliability.